



Patent

Sonnenschein 0-03-153 (15990/US/03)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor: Sonnenschein
Serial no.: 10/631,178
Filed: July 31, 2003
Title: AUTOCLAVABLE IMAGER ASSEMBLY
Examiner: Timothy J. Henn
Art Unit: 2622

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Response and Amendment

This response is in reply to the office action that was mailed on April 19, 2007. In this response, the applicant has amended the claims and presented a response to address the prior art and the claim amendments.

Claim amendments:

Claim 1 has been amended to more clearly define the invention. Specifically: in section (b) has been amended to emphasis that the objective lens system 100 is attached directly to the light receiving face of the sensor [see pg. 19, lines 15-17 of the PCT publication and Figs. 1, 2, 5A, 6 a, and 6B]; in section (c) has been amended to clarify the previous wording; and the wherein clause has been amended to emphasis that at least some of the conductive leads of the sensors and some of the electrical elements are connected to each other and to other wiring of the electrical circuit directly, i.e. without the use of electrical terminals on PCB (or equivalent boards) [see page 27, lines 12-16 of the PCT publication for antecedent basis].

New claim 32 contains features deleted from claim 1.

New claim 33 applies to the embodiments shown in Figs. 5A, 5B, 6A, and 6B.

Claim rejections:

The examiner has rejected claims 1-10, 14, and 15 under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US 6,042,930) and claims 11-13 under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US 6,042,930) in view of Upton et al. (US 6,141,037).

Neither of the cited patents describes an imager assembly in which the objective lens system is attached directly to the top (light receiving) face of the imaging sensor. Attaching the lens directly to the sensor element reduces the overall length of the camera, which in turn allows a smaller radius of curvature, allowing the endoscope to be bent around shaper angles. Recalling that one of the objectives of the invention is to provide an imager assembly having minimal dimensions, it is obvious that this feature of claim 1, which is not present in the prior art, is essential to realize the goal of the invention. Furthermore, by attaching the lens system directly

to the sensor, simplifies the design of the objective lens system using fewer lenses, possibly reducing the number of lenses and thereby improving image quality by reducing scattering and other distortions caused when the light passes from one element to another.

Another essential feature of the invention, as expressed in claim 1 is that at least some of the leads to and from the sensor element and the various electrical components are connected directly to each other without the use of PCB's. This is another feature that allows the imager assembly to have minimal size.

On the other hand, Ito et al. teach that it is essential to their invention to have two circuit boards. One is a flexible circuit board 20 comprising inner leads 22. One end of each lead 22 is attached to a pad 12 on the light receiving surface of the imaging element. The inner leads 22 are enclosed in the flexible circuit board and the free ends 23 are attached directly to the second circuit board (wiring circuit board 62) on which are mounted electronic parts 61 and to which are connected the wires that carry signals to and from and power to the camera. In other words, all electrical connections are made directly on the circuit board.

Upton et al. are silent about the structure of the electrical circuitry of their camera system. Unlike the present invention and that of Ito et al., wherein the camera is to be mounted at the distal end of an endoscopic device, the camera of Upton et al. is attached either physically or optically/electrically to the proximal end of the endoscope, i.e. there was no necessity to limit the size of the camera. In this case, in the absence of any teaching to the contrary, it is only reasonable to assume that the circuit design is the conventional one based on the technology in use at the time of the invention, i.e. the use of PCBs or their equivalent.

In view of the fact that at least two of the essential features of claim 1 of the present application are absent in the cited prior art, Applicant feels that the objections have been overcome and respectfully requests that Examiner reconsider his rejections and allow all of the claims.

Date:

July 12, 2007

Respectfully submitted,

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Date July 12, 2007 Kevin D. McCarthy

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